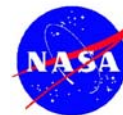




STATEMENT OF BASIS

VAB UTILITY ANNEX SWMU 35 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION KENNEDY SPACE CENTER BREVARD COUNTY, FLORIDA



PURPOSE OF STATEMENT OF BASIS

This Statement of Basis (SB) has been developed to inform and give the public an opportunity to comment on a proposed remedy to address contamination at the Vehicle Assembly Building (VAB) Utility Annex¹. A Kennedy Space Center (KSC) remediation team consisting of National Aeronautics and Space Administration (NASA), United States Environmental Protection Agency (EPA), and Florida Department of Environmental Protection (FDEP) has determined that the proposed remedy is cost effective and protective of human health and the environment. However, before implementing the proposed remedy, the KSC remediation team would like to give an opportunity for the public to comment on the proposed remedy. At any time during the public comment period, the public may comment as explained in the “How Do You Participate” section of this SB. After the end of the public comment period, the KSC remediation team will review all comments and issues raised in the comments and determine if there is a need to modify the proposed remedy before implementation.

WHY IS A REMEDY NEEDED?

The results of the Resource Conservation

and Recovery Act (RCRA) Facility Investigation (RFI) indicated that the polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs) listed in Table 1 are present in the soil and groundwater, respectively, and could potentially be harmful to human health.

HOW DO YOU PARTICIPATE?

The KSC remediation team solicits public review and comment on this SB before implementing the proposed remedy. The remedy for the VAB Utility Annex will eventually be incorporated into the Hazardous and Solid Waste Amendments (HSWA) permit for the Kennedy Space Center (KSC). The public comment period for this SB and proposed remedy will begin on the date of publication for notice of availability of the SB in major local

The Proposed Remedy

The proposed cleanup remedy for VAB Utility Annex includes the following components:

- Natural attenuation of groundwater to remove contaminants through natural processes
- Monitoring of groundwater to document water quality and contaminant levels
- Implementing institutional controls to prohibit residential exposure to site soils/dry sediment and the use of groundwater as a potable water supply

1. In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for NASA KSC Vehicle Assembly Building (VAB) Utility Annex. For Detailed information on the site, consult the VAB RFI Report, which is available for review at the information repository located at the NASA Document Library, North Brevard Library, 2121 South Hopkins Avenue, Titusville, FL 32780, telephone: (321) 264-5026.

newspapers of general circulation, and end 45 days thereafter. If requested during the comment period, the KSC remediation team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. Timothy J. Bahr, P.G.
FDEP – Bureau of Waste Cleanup
2600 Blair Stone Road, MS 4535
Tallahassee, FL 32399-2400

The HSWA Permit, SB, and associated administrative file, including the RFI Report, will be available to the public for viewing and copying at:

NASA Document Library
North Brevard Library
2121 South Hopkins Avenue
Titusville, FL 32780
Telephone: (321) 264-5026

To request further information, you may contact one of the following people:

Mr. Harold Williams
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FACILITY DESCRIPTION

NASA established KSC as the primary launch site for the space program. These operations have involved the use of toxic and hazardous materials. Under the RCRA and applicable HSWA permit (Permit No. FL6800014585) issued by the FDEP and/or EPA, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 35, the VAB Utility Annex.

SITE DESCRIPTION AND HISTORY

The VAB is a NASA-operated facility located on Utility Road, north of Saturn Causeway at Kennedy Space Center, Florida (Figure 1). The VAB Utility Annex is southwest of the main VAB, which is the facility where major space shuttle components are assembled and where orbiter external tanks are stored.

The VAB Utility Annex serves as a centralized supply point for both chilled and hot water while each facility's air conditioning system is controlled locally. Additionally, compressed air generated by four large air compressors is supplied to local pneumatic systems.

The area of the VAB Utility Annex covered by this SB is situated predominantly south and immediately adjacent to the VAB Utility

Annex building (Figure 2). There are two structures within the designated SWMU that are used for chemical and/or fuel storage: the aboveground storage tank (AST) farm, and a petroleum, oil and lubricant (POL) shed (K6-947A). These structures are located outside the VAB Utility Annex Building (K6-947).

The ASTs are south of the VAB Utility Annex and store fuel for utility plant equipment. The POL shed is northwest of the ASTs and adjacent to the VAB Utility Annex. This building serves as storage for petroleum-based products and used oil that are generated at the VAB Utility Annex. Cooling towers for chilled water used in the VAB area air conditioning systems are immediately south of the ASTs.

Three of the AST tanks have a capacity of 30,000 gallons each, and one has a capacity of 10,000 gallons. The 30,000-gallon tanks are used to fuel high temperature hot water boilers and the 10,000-gallon tank fuels and emergency generator located at the Utility Annex. The tanks have been in operation since approximately 1967. The tank farm was retrofitted in 1992 to comply with new provisions in the Florida Administrative Code (FAC) for ASTs. In accordance with provisions in Chapter 17-761, FAC, retrofitting was completed by installing an impervious concrete floor and berm. During retrofitting activities, black stained soil was observed at the southern portion of the tank farm area. It is suspected that the soil was impacted as a result of unreported de minimis spills and dispenser drippage over the history of operations. The visibly stained soil was removed before the concrete floor was installed.

The POL shed was installed northwest of the tank farm in 1988. Products typically stored in the POL shed include various lubricating

oils, degreasers, and gasoline. Used oil removed from a generator approximately every three months is containerized in a 55-gallon drum that is stored in the POL shed. When the drum is full the contents are pumped from the drum and transported off-site by a used oil disposal contractor. The 55-gallon drum is emptied approximately every six months. There have been no reported spills in the area around the POL shed.

The VAB Utility Annex Cooling Towers were constructed in 1991 approximately 40 feet south of the ASTs. The towers receive condensate from chilled water air conditioning systems in the VAB area. Water from the air conditioners is routed through underground piping to the cooling towers where it is cooled and returned to the air conditioning systems in a cyclical process. Water loss due to evaporation is replenished with potable water piped directly from City of Cocoa water supplies.

The VAB Utility Annex area designated as the SWMU is L-shaped and encompasses approximately $\frac{3}{4}$ of an acre of land. Investigations conducted at the site include:

- 1989-1993: Soil samples were collected at numerous locations and at depths of up to about 6 feet. The samples were analyzed in the field using an organic vapor analyzer and indicated the presence of elevated concentrations of organic vapors. Confirmation samples sent to a laboratory did not confirm the presence of organic chemicals in the soil. Groundwater samples were collected from shallow wells and using direct-push sampling tools. Chlorinated VOCs and naphthalene were detected.
- 1994-1998: An RFI was conducted that included sampling and analyzing surface

and subsurface soil, sediment (from drainage swales), and groundwater samples. Results of these analyses were used to determine potential increased human health and ecological risks. A Preliminary Risk Evaluation (PRE) for human health indicated that groundwater containing chlorinated VOCs would result in an unacceptable increased human health risk if the groundwater were used as a source of drinking water. One sediment sample collected near a drain outfall also contained polynuclear aromatic hydrocarbons (PAHs) above risk-based criteria. The soil in this area was removed as an interim corrective measure. PCBs also were detected in two samples collected from the drainage swale. The preliminary ecological risk assessment indicated that there were no complete exposure pathways at the site.

- 2000-2001: Groundwater samples were collected from on-site wells as part of an approved groundwater monitoring plan. Two compounds (benzene and vinyl chloride) were detected above FDEP and EPA cleanup target levels.

SUMMARY OF SITE RISK

As part of the RFI activities, risk assessments were completed in accordance with KSC's remediation team-developed Risk Assessment Decision Process Document for KSC, Florida. The Phase I ERA was performed in accordance with the EPA's "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments", dated 1997.

Chemicals of Concern (COCs) identified for human health during the RFI and supplemental sampling activities include:

- Groundwater: Chlorinated VOCs.
- Soil (dry sediment): PCBs.

The PRE showed the estimated excess lifetime cancer risk (ELCR) for the hypothetical future resident was determined to be about 1 in 1,000, which is above the EPA acceptable range of 1 in a million to 1 in 10,000 and the FDEP acceptable level of 1 in a million. The main contaminant contributing to this cancer risk is vinyl chloride in groundwater. Subsequent sampling was conducted as part of an approved monitoring program. Vinyl chloride was detected in only one well at 1.6 ug/l. Soil containing PAHs was excavated as part of an interim measure.

The ERA did not identify any unacceptable ecological risks.

WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objectives (RAO) are to: (1) protect humans from exposure to groundwater by (a) preventing its use as a drinking water source in the shallow aquifer where contaminant concentrations are higher than cleanup target levels, and (b) to achieve groundwater cleanup; and (2) protect humans from exposure to soil by limiting access where concentrations exceed residential risk-based criteria and are above background concentrations. Table 1 lists the COCs present at the VAB Utility Annex. The groundwater data are based on the round of samples collected in June 2001. The first column lists the chemical name, the second column lists the range of concentrations detected in groundwater and soil (dry sediment) present at the VAB Utility Annex during the RFI, and the last column

presents the FDEP/EPA cleanup target levels to be achieved at the site.

Table 1

Site-Related Chemicals of Concern (COCs)	Range of Detections	Site-Specific Cleanup Level
Groundwater (ug/l) ¹		
Benzene	1.7	1
Vinyl Chloride	1.6	1
Soil/dry sediment (mg/kg)		
PCBs	0.78-1.15	0.5/2.1 ²

1. Samples collected June 2001. Cleanup levels are GCTLs in Florida Administrative Code 62-777.
2. Florida Administrative Code 62-777 for residential/industrial exposure.

REMEDIAL ALTERNATIVES FOR THE VAB

Because of the very low level of groundwater contamination and isolated nature and level of the soil contamination, only one remedy was considered for the VAB:

- Land use controls and natural attenuation with long-term groundwater monitoring

Land Use Controls and Natural Attenuation with Long-Term Monitoring:

Natural processes such as biological

degradation, dispersion, advection, and adsorption will reduce COC concentrations to cleanup levels over time. Groundwater would be regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations. Data collected during the RFI indicated that biodegradation will likely reduce contaminant concentrations below cleanup levels within five years. In the long term, this alternative will meet the RAOs for groundwater and will also allow re-evaluation to determine if the remedy is working and provide an opportunity for change, if necessary. In addition, institutional controls will be implemented to limit access to the site soils/dry sediment by individuals other than industrial workers and to prevent the use of groundwater as a drinking water source. NASA, USEPA and the FDEP have entered into a Memorandum of Agreement (MOA) that outlines how institutional controls will be managed at NASA². The MOA requires periodic site inspection, condition certification and agency notification. The area of the site that will be under institutional controls is shown on Figure 2.

EVALUATION OF REMEDY

The selected remedy was evaluated to determine if it will comply with EPA's four threshold criteria and five balancing criteria for corrective measures. The four threshold criteria for corrective measures are:

2. By separate MOA effective February 23, 2001, with the EPA and FDEP, KSC, on behalf of NASA, agreed to implement Center-wide, certain periodic site inspection, condition certification and agency notification procedures designed to ensure the maintenance by Center personnel of any site-specific LUCs deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the Center's substantial good faith compliance with the procedures called for herein, reasonable assurances would be provided to EPA and FDEP as to the permanency of those remedies which included the use of specific LUCs.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by NASA KSC, EPA and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent upon the Center's substantial good faith compliance with the specific LUC maintenance commitments reflected herein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

- overall protection of human health and the environment;
- attain media cleanup standards;
- control the sources of releases; and
- comply with standards for management of wastes.

The five balancing criteria are:

- long term reliability and effectiveness;
- reduction in the toxicity, mobility or volume of wastes;
- short term effectiveness;
- implementability; and
- cost.

Natural Attenuation and land use controls meets each of the threshold criteria and was determined to be the best overall approach with respect to the balancing criteria.

WHAT IMPACTS WOULD THE REMEDY HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the local community because groundwater is not used for potable water in the vicinity of the site. The natural attenuation and long-term monitoring alternative includes administrative actions to limit the access to the site and the use of groundwater until cleanup target levels are achieved.

WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?

The KSC remediation team recommends the proposed remedy because it is an effective means to remediate low concentrations of VOCs. The long-term monitoring will be used to monitor and document reduction in

contaminant concentrations to cleanup target levels. The institutional controls will also prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets the EPA's nine criteria for corrective measures.

NEXT STEPS

The KSC remediation team will review all comments on this SB to determine if the proposed remedy needs to be modified before implementing and before incorporating the proposed remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then a Land Use Control Implementation Plan will be developed to incorporate the institutional controls at this site.